

REMARKS

At the time of the Final Office Action dated April 9, 2004, claims 1-16 were pending in this application. Of those claims, claims 15 and 16 have been rejected and claims 1-14 have been withdrawn from consideration pursuant to the provisions of 37 C.F.R. § 1.142(b). Claims 15 and 16 have been amended to clarify the limitations recited therein. Applicant submits that the present Amendment does not generate any new matter issue.

On page two of the Office Action, the Examiner objected to the claims based on various informalities. With regard to the Examiner's objection to the phrase "on an under layer of the," for which the Examiner asserted that the specification did not support the existence of an additional layer, Applicant notes that this term has been removed from both claims 15 and 16. Instead the phrase "on one face of" has been used since this term does not require the existence of an additional layer.

The Examiner asserted that the term "function group" is unclear. In this regard, the Examiner is referred to the paragraph spanning pages 20 and 21 in Applicant's disclosure, in which support for this term can be found.

The Examiner also asserted that claims 15 and 16 recite that the projecting patterns are formed under the orientation films, which is not supported by the specification. In response, Applicant notes that claims 15 and 16 have been amended to clarify that the projecting pattern is formed prior to the step of forming the orientation controlling membrane, which the Examiner

admits is supported by the Applicant's disclosure. On this basis, Applicant submits that the Examiner's objections to these terms have been traversed.

On page three of the Office Action, the Examiner objected to Figs. 8(a)-10(b) of the drawings pursuant to M.P.E.P. § 608.02(g), requiring that which is old be labeled as "PRIOR ART." In response, it is proposed to amend Figs. 8(a)-10(b) to label these figures as prior art.

Claims 15 and 16 are rejected under 35 U.S.C. § 103 for obviousness based on Shimada et al., U.S. Patent No. 5,852,485 (hereinafter Shimada), in view of Yih, U.S. Patent No. 3,866,313 and further in view of Suzuki, U.S. Patent No. 6,509,948, and Utsumi et al., U.S. Patent No. 6,441,880 (hereinafter Utsumi)

In the Amendment filed on December 19, 2003, in responding to a rejection of claims 15 and 16 based upon Shimada, Yih, Suzuki and Utsumi, Applicant argued that Suzuki teaches a spacer that is fixed neither to a first substrate nor a second substrate, as recited in the claims, since the spacer moves freely for the stated purpose of preventing liquid crystals from being abnormally oriented. Applicant also argued that none of the applied prior art teaches that a spacer is attached to either substrate via van der Waals bonding or hydrogen bonding.

On page eleven of the Office Action, the Examiner responded to the first argument discussed above by stating "the existence of additional spacers is not precluded by the present claim language," and the Examiner responded to the second argument by stating that newly-cited Shigeta teaches the use of hydrogen bonding.

Applicant respectfully submits that one having ordinary skill in the art would not have arrived at the claimed invention based upon the additional teachings of Shigeta. In Shigeta, the spacers 96 illustrated in Fig. 29 are attached to both substrates 102, 104. This teaches away from the claimed invention, which recites that "all spacers disposed at parts other than said projecting pattern [around brought] into contact only with the orientation controlling membrane of either the first substrate or the second substrate," and thus all spacers only contact one (and not both) of the orientation controlling membranes of the substrates. In so doing, the spacers of the claimed invention are bonded with the orientation membrane within a small area so that the light pass region being restrained is small.

Shigeta is also directed to achieving different advantages, which include "uniform cell thickness, high shock resistance, and a desirable displaying quality." These asserted advantages are a result of the attachment of the spacers 96 to both substrates and the spacers 96 being formed from a resin material, and not the hydrogen bonding between the spacers 96 and the substrates 102, 104. Thus, one having ordinary skill in the art would not have been motivated to employ hydrogen bonding, as taught by Shigeta, for the reasons stated by the Examiner because the advantages asserted by the Examiner are not a result of hydrogen bonding of the spacers 96 to the substrates.

Also, the asserted benefits relied upon for using Shigeta and Suzuki are mutually exclusive. The asserted benefits of Suzuki are a result of the spacers moving freely, whereas the asserted benefits of Shigeta are a result of the spacers being bonded to both substrates (and thus being unable to move freely). Furthermore, the claimed invention is directed to the spacers be

bonded to only one of the orientation controlling membranes, which is neither taught nor suggested, by Shigeta and Suzuki, alone or in combination. Thus, one having ordinary skill in the art would not have arrived at the claimed invention based upon the additional teachings of Shigeta.

Utsumi discloses an arrangement in which a spacer is disposed between first and second substrates. An orientation controlling membrane is disposed between the spacer and a liquid crystal layer, and the orientation controlling membrane is irradiated with a deflection beam to apply a liquid crystal orientation. This reduces orientation irregularity in the vicinity of the spacer, and thus, light leakage due to the orientation irregularity is also reduced. Utsumi, however, does not teach or suggest bringing the spacer into contact only with either the first substrate or the second substrate and fixing the spacer thereto. Moreover, Utsumi does not teach or suggest that the force for bringing the spacer into contact with either substrate is provided via van der Waals bonding or hydrogen bonding.

Suzuki discloses a liquid crystal panel having spaces between the first and second substrates in which the spacer is interposed. The space at the display picture element portion is has a diameter larger than that of the spacer, while the space at the portion corresponding to the shading membrane has a diameter smaller than that of the spacer. In Suzuki, the spacer is not arranged to come in contact with and be fixed to only either the first substrate or the second substrate, as recited in claims 15 and 16. At the display picture element portion, the spacer is fixed to neither the first substrate nor the second substrate and moves freely for the stated purpose of preventing liquid crystal molecules from being abnormally oriented. Furthermore, at

the portion where the spacer and both substrates are fixed to each other, Suzuki does not teach or suggest that the fixation is achieved via van der Waals bonding or hydrogen bonding.

Therefore, none of the applied prior art, either alone or in combination, teach or suggest the following limitations: (i) bringing the spacer into contact only with either the first substrate or the second substrate and fixing the spacer thereto, (ii) the force for bringing the spacer into contact with either substrate is provided via van der Waals bonding or hydrogen bonding, and (iii) forming the projecting pattern at a position corresponding to the scan line on one face of the first substrate or at a position corresponding to the shading membrane on one face of the second substrate, which are recited in both claims 15 and 16. Applicant, therefore, respectfully solicits withdrawal of the imposed rejection of claims 15 and 16 under 35 U.S.C. § 103 for obviousness based Shimada in view of Yih, Suzuki, Utsumi and Shigeta.

Applicant has made every effort to present claims which distinguish over the prior art, and it is believed that all claims are in condition for allowance. However, Applicant invites the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. Accordingly, and in view of the foregoing remarks, Applicant hereby respectfully requests reconsideration and prompt allowance of the pending claims.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account 500417, and please credit any excess fees to such deposit account.

Respectfully submitted,

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